

The present version of claims is as follows:

IN THE CLAIMS

Claim 13: A method of fabricating a structure comprising:

forming a sacrificial layer over a first surface of a substrate;

forming a silicon layer over the sacrificial layer;

removing the sacrificial layer; and

controlling a residual stress of the silicon layer to insure that the silicon layer has a residual stress within a range of between about –50 to 50 mega-Pascals and a grain structure including grains defining pores therebetween wherein the grains have an approximately hemispherical shape.

Claim 14: The method of claim 13 further including forming a passageway through the substrate.

Claim 15: The method of claim 13 further including forming a conformal layer over the silicon layer to provide a selected chemical or biological function.

Claim 16: A method of fabricating a structure comprising:

forming a sacrificial layer over a surface of a substrate;

forming a structural layer over the sacrificial layer;

forming a silicon layer over the structural layer;

removing the sacrificial layer; and

controlling the parameters of the silicon layer forming step to insure that the silicon layer has a residual stress within a range of between about –100 to 100 mega-Pascals and a grain structure including grains defining pores therebetween wherein the grains have an approximately hemispherical shape.

Claim 17: A method of fabricating a structure comprising:

forming a sacrificial layer over a first surface of a substrate; and

growing a silicon film over the sacrificial layer at a temperature near the tensile-to-compressive transition temperature of the silicon film, and controlling a residual stress of the silicon film such that the silicon film has a residual stress within a range of about –100 to 100

mega-Pascals and a grain structure including a layer of grains having an approximately hemispherical shape wherein pores are defined by gaps between adjacent grains.

Claim 18: The method of claim 17 wherein the silicon film is formed under a near zero-stress condition.

Claim 19: The method of claim 17 wherein the silicon film has a residual stress within a range of about –50 to 50 mega-Pascals.

Claim 21: The method of claim 17 wherein the silicon film is grown such that a lateral dimension of any pore is less than that of any grain.

Claim 22: The method of claim 17 wherein the silicon film is grown such that a lateral dimension of the pores is between about 10 and 50 nanometers.

Claim 23: The method of claim 17 wherein the silicon film is grown such that the thickness of the film is between about 50 and 150 nanometers.

Claim 24: The method of claim 17 wherein the silicon film is grown such that the roughness of the film is approximately equal to its thickness.

Claim 25: The method of claim 17 further including forming a conformal layer on the silicon film to provide a selected chemical or biological function.

Claim 27: The method of claim 17 wherein the silicon film is used to form a membrane filter structure.

Claim 28: (Currently amended) A method of fabricating a structure comprising:
forming a silicon layer over a first surface of a substrate; and
controlling the parameters of the forming step to insure that the silicon layer has a residual stress within a range of between about –100 to 100 mega-Pascals and a grain structure including a single layer of grains of approximately hemispherical shape defining pores therebetween.